



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/748,653	12/30/2003	Bruce L. Cannon	59119US002	6901
32692	7590	01/25/2005	EXAMINER	
3M INNOVATIVE PROPERTIES COMPANY			SEVER, ANDREW T	
PO BOX 33427			ART UNIT	
ST. PAUL, MN 55133-3427			PAPER NUMBER	
			2851	

DATE MAILED: 01/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/748,653

Applicant(s)

CANNON ET AL.

Examiner

Andrew T Sever

Art Unit

2851

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --****Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. ____   |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>4/2004, 7/2004</u> .  | 6) <input type="checkbox"/> Other: ____                                     |

## **DETAILED ACTION**

### ***Drawings***

1. Figures 1, 2A, 2B, 3, and 4A should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 26 recites the limitation "the elliptical cross-section defines a major axis" in claim

14. There is insufficient antecedent basis for this limitation in the claim.

Claim 14 does not claim any object having an elliptical cross-section, given that there are at least three claimed components in claim 14 that could have an elliptical cross-section (the light source, the light beam, and the aperture) and the further limitation of claim 26 "the non-circular aperture..." does not completely clarify which component claim 26 is referring to and since even more items in the invention and intervening claims between 14 and 26 have cross-sections (that are either potentially elliptical or claimed to be) it

Art Unit: 2851

cannot be determined what claim 26 should have been dependent on. Accordingly claim 26 is rejected under 35 USC 112 2<sup>nd</sup> for being indefinite since it is not clear what is being claimed. For purposes of a prior art rejection the assumption will be made that the light source is to have an elliptical cross-section, if this is in error, applicant should review the other rejections below.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 2, and 4-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishimae et al. (US 6,724,546) in view of Dewald (US 6,591,022.)

Nishimae teaches in figure 1a an image display system, comprising an integrator (5);

An image display unit (11) disposed on the path of the output light beam; and

A non-circular aperture (7) disposed on the path of the output light beam between the integrator and the image display unit (See figure 4b which shows the shape of the aperture.)

Nishimae does not teach that the integrator is capable of producing a non-circular output light beam when illuminated by a circular input light beam. Dewald teaches a similar

image display system in figure 6, which includes an integrator (604) and a color wheel (606) to make the output light have color. As can clearly be seen in figure 6 and in more detail in figure 9 the input circular light is made non-circular by the light guide. Dewald teaches in column 7, lines 11-21 that by using such exit aperture of the integrator distortion is eliminated with respect to the color wheel and the final image. Since it is highly desirable to eliminate any distortions possible in an image display system such as taught by Nishimae it would have been obvious to one of ordinary skill in the art at the time the invention was made to include the integrator of Dewald that is capable of producing a non-circular output light beam, so as to eliminate distortions. (It should be noted that Nishimae also teaches a color wheel in figure 1A part 4, although it is placed before the integrator in light of the teachings of Dewald that the integrator can be used to eliminate or lessen distortions caused by the color wheel it would be obvious to place it after the integrator as taught by Dewald.)

*With regards to applicant's claim 2:*

The light source of Nishimae is described as being nearly a point light source that is surrounded by a parabolic reflector which as well known in the art produces a circular input light beam.

*With regards to applicant's claim 4:*

The color wheel is a color filter unit.

Art Unit: 2851

*With regards to applicant's claim 5:*

Part 12 of Nishimae is a projection lens.

*With regards to applicant's claims 6, 10, and 11:*

See column 2 lines 21-38 of Nishimae, which teaches that the image display unit comprises an array of tiltable mirrors.

*With regards to applicant's claim 7:*

Nishimae includes a projection lens unit (12).

*With regards to applicant's claim 8:*

Part 10 of Nishimae is a TIR prism.

*With regards to applicant's claims 9 and 12:*

See figure 18a of Nishimae, which shows that with the teachings of Nishimae the center of the projection lens pupil is non-coincident with a central ray of the image light beam (the reflected light beam from the DMD is off axis, compared to the prior art projector.)

*With regards to applicant's claim 13:*

Since the long axis of the output light (as taught by Dewald) is determined based on the dimensions of the color wheel filter sections and one of ordinary skill in the art would not expect these to have any relationship to the pivot axis of the mirror devices and since the aperture's long axis (the axis in figure 4b the runs the length of the page rather than the shorter axis that is perpendicular to it) is set based on the pivot axis (see figures 6a and 6b), it have been obvious to one of ordinary skill in the art not to have the long dimension of the non-circular output light beam be parallel to that of the non-circular aperture.

*With regards to applicant's claims 14-17, and 22-26:*

See above, the light source includes the light integrator of Dewald, which has an output of non-circular cross-section illumination light. The long dimension is the larger dimension while the short dimensions is that perpendicular to it. (With regards to claim 26 as nearly as can be understood see the previous argument also see the embodiment described below with regards to applicant's claims 18-21.)

*With regards to applicant's claims 18-21:*

As shown in figures 17c and 18a (a different embodiment), the output of Nishimae's illumination light (the light illuminating the modulator) is made elliptical (which by definition has major and minor axes) and has one axis parallel with the pivot axes.

Art Unit: 2851

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishimae in view of Dewald as applied to claims 1, 2, and 4-26 above, and further in view of Koyama et al. (US 6,607,280.)

Nishimae in view of Dewald as described above in more detail teaches an image display system which among other things teaches an integrator. Nishimae in view of Dewald does not necessarily teach that the integrator is a tapered tunnel integrator.

Koyama teaches in figure 7 an integrator, which is a tapered tunnel integrator in a display device. Koyama teaches in column 15 lines 43-62 and column 16 lines 21-38 that a tapered integrator has the advantage of allowing for color non-uniformity and luminance non-uniformity to be corrected to be nearly uniform. Given that having uniform color in the color beam (a light beam that is white and is not spread out in the form of a spectrum) allows for a better more uniform light beam after passing through the color wheel of Dewald, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the tapered tunnel integrator of Koyama with the non-circular output as taught by Dewald in the image display system taught by Nishimae in view of Dewald.

### ***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:



Art Unit: 2851

US 2004/0080723 to Inamoto teaches an asymmetric aperture in figure 1 for an image display system shown in figure 2.

US 6,773,120 to Colpaert teaches in figure 1 a display system which includes an integrator and in figure 4 shows an aperture.

US 2004/0119950 to Penn et al. teaches in figures 2 and 3b a display system and asymmetric aperture respectively.

US 2001/0026450 to Li teaches in figures 8A-E various apertures for tapered tunnel integrators.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew T Sever whose telephone number is 571-272-2128. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on 571-272-2258. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2851

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AS

A handwritten signature in black ink, appearing to read "Judy Nguyen", is positioned above the printed name and title.

**JUDY NGUYEN**  
**SUPERVISORY PATENT EXAMINER**